



OFFICE OF THE INSPECTOR GENERAL

U.S. NUCLEAR REGULATORY COMMISSION

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Audit of NRC's Web-Based Licensing System (WBL)

OIG-15-A-17

June 29, 2015



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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

**OFFICE OF THE
INSPECTOR GENERAL**

June 29, 2015

MEMORANDUM TO: Mark A. Satorius
Executive Director for Operations

FROM: Stephen D. Dingbaum **/RA/**
Assistant Inspector General for Audits

SUBJECT: AUDIT OF NRC'S WEB-BASED LICENSING SYSTEM
(WBL) (OIG-15-A-17)

Attached is the Office of the Inspector General's (OIG) audit report titled *Audit of NRC's Web-Based Licensing System (WBL)*.

The report presents the results of the subject audit. Following the June 18, 2015, exit conference, agency staff indicated that they had no formal comments for inclusion in this report.

Please provide information on actions taken or planned on each of the recommendations within 30 days of the date of this memorandum. Actions taken or planned are subject to OIG followup as stated in Management Directive 6.1.

We appreciate the cooperation extended to us by members of your staff during the audit. If you have any questions or comments about our report, please contact me at (301) 415-5915 or Beth Serepca, Team Leader, at (301) 415-5911.

Attachment: As stated



Office of the Inspector General

U.S. Nuclear Regulatory Commission
Defense Nuclear Facilities Safety Board

OIG-15-A-17

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Results in Brief

Why We Did This Review

The Nuclear Regulatory Commission's (NRC) primary mission is to license and regulate the use of radioactive materials for civilian purposes to ensure adequate protection of public health and safety and the environment. NRC's recent Project Aim 2020 report noted that, although NRC accomplishes its mission, a lack of standardized processes is an obstacle to efficiency and agility.

Deployed in 2012, NRC's Web-Based Licensing System (WBL) serves as an up-to-date repository of all NRC materials licenses, and as a Web-based license tool for NRC to manage the license process and information on NRC licensees. The incorporation of additional modules, such as for inspection and reciprocity tracking, ties various NRC oversight activities to the most up-to-date license information.

The audit objective was to determine whether WBL meets its required operational capabilities and provides for the security, availability, and integrity of the system data.

Audit of NRC's Web-Based Licensing System (WBL)

What We Found

Through its design and continuous improvement process, WBL generally meets required operational capabilities outlined in system requirements documents. However, use of WBL can be improved to better support effective and efficient operations. Specifically, we found that varied use of WBL among the NRC regions, outdated business processes, and lack of standardization hinder efficiency and effectiveness.

By providing automated controls, WBL should support effective and efficient operations. However, materials oversight business processes are structured on outdated guidance. Outdated businesses processes increase time and costs because the "right" people for optimal results are not using WBL. OIG concludes that full implementation of WBL's capabilities can unify NRC's oversight of materials licensees and support national efforts to monitor and secure radioactive materials.

What We Recommend

OIG recommends steps to improve NRC's utilization of WBL. In particular, the agency should develop and implement agencywide standardized business processes for WBL use and require license reviewers and materials inspectors to process their work directly in WBL. Also, NRC should develop quality assurance mechanisms for confirmation of data changes in the system. Further, the agency should identify user needs for enhancement of WBL inspection module functionality.

Management stated their general agreement with the findings and recommendations in this report.

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ABBREVIATIONS AND ACRONYMS

LVS	License Verification System
NRC	U.S. Nuclear Regulatory Commission
NSTS	National Source Tracking System
OIG	Office of the Inspector General
WBL	Web-Based Licensing System

I. BACKGROUND

The Nuclear Regulatory Commission's (NRC) primary mission is to license and regulate the use of radioactive materials for civilian purposes to ensure adequate protection of public health and safety and the environment. NRC fulfills this mission by issuing licenses to individuals and organizations for the use of radioactive materials and by conducting inspections of licensee activities to ensure conformity with safety requirements.

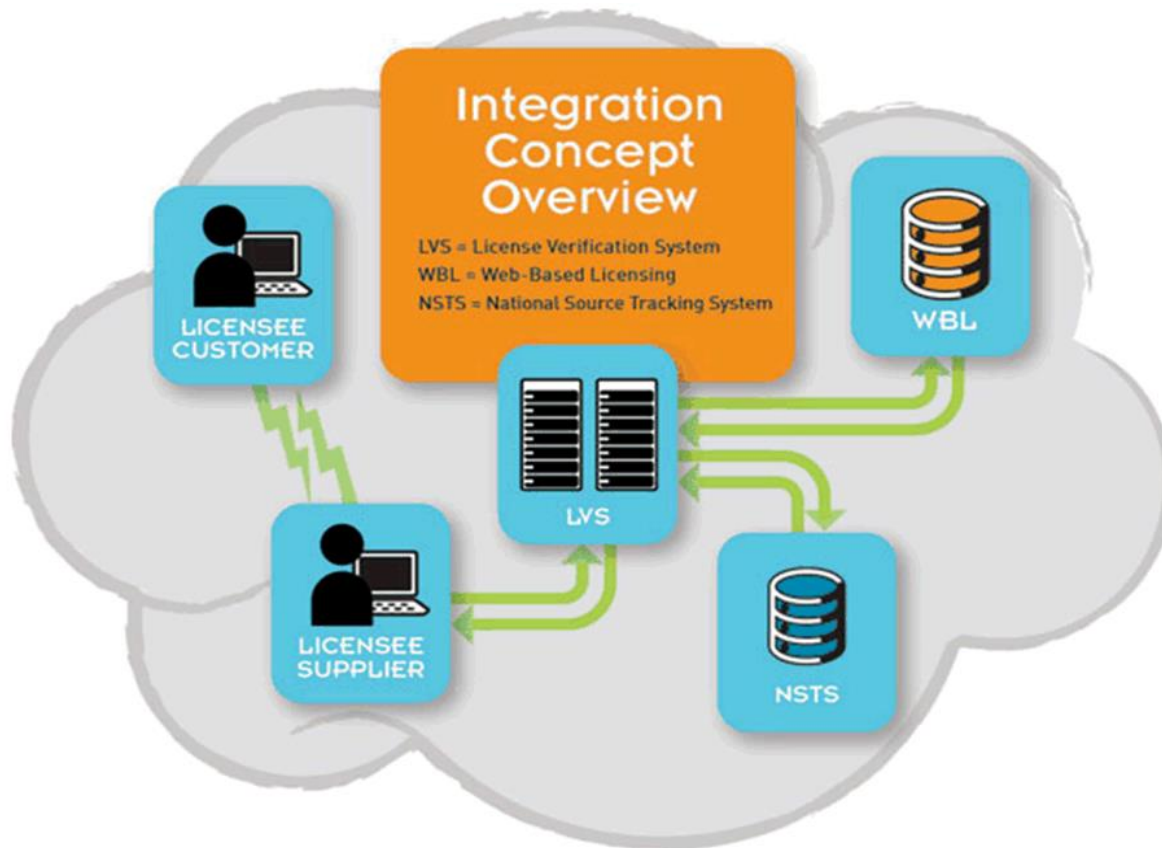
NRC's Office of Nuclear Material Safety and Safeguards, Division of Material Safety, State, Tribal, and Rulemaking Programs, oversees and implements the National Materials Program.¹ The division develops policy and procedures for assessing performance and provides technical support and guidance to NRC's regions for materials licensing, inspection, and enforcement activities. NRC offices in Regions I, III, and IV conduct licensing and inspection activities. Agreement States² are responsible for certain radioactive material oversight activities within their jurisdictions.

Responding to a 2007 congressional mandate to enhance tracking and verification of radioactive materials transactions, NRC developed the Integrated Source Management Portfolio. The portfolio is a suite of systems including the National Source Tracking System (NSTS), the License Verification System, and the Web-Based Licensing System (WBL). Data from the NSTS and WBL support license verification that allows suppliers to validate a purchaser's license and the quantity of radioactive material the license authorizes. The systems are nationwide, including information on both NRC and Agreement State radioactive materials licenses.

¹ The National Materials Program is a term used to define the broad collective framework within which both NRC and the Agreement States function in carrying out their respective radiation safety regulatory programs.

² Agreement States enter into an agreement with NRC that gives the State the authority to license and inspect byproduct, source, and noncritical quantities of special nuclear materials used or possessed within its borders. Only NRC regulates nuclear reactors, fuel fabrication facilities, and critical quantities of "special nuclear material"—that is, radioactive material that can fission or split apart.

Figure 1: The Integrated Source Management Portfolio



Source: NRC

WBL was deployed in 2012 to replace and enhance functionality of several NRC legacy systems, including the following:

- License Tracking System.
- Inspection Planning System.

- Reciprocity Tracking System.³
- Transportation Approval Package Information System.⁴

WBL serves as an up-to-date repository of all NRC licenses and Category 1 and 2⁵ Agreement State licenses. In addition, it serves as a Web-based licensing tool for NRC to manage the licensing process and information on NRC licensees. WBL supports the entry of licensing information and license images, allowing NRC to manage the licensing life cycle from initial application through license issuance, amendment, reporting, and termination.

WBL allows for almost unlimited users compared to the legacy mainframe-based systems. Users are assigned roles in WBL according to their authority. WBL's database contains more information fields for each license than the legacy systems and offers flexible search functions to retrieve data on licenses. WBL is designed to generate the materials license and other licensing and inspection documents with the latest data from the system. WBL is currently capable of generating routine correspondence letters, and work is ongoing to extend this capability to generation of materials licenses in the system. WBL also includes information on Agreement State licenses submitted by the States to support license verification. NRC provides the WBL system, and associated startup and user training support, at no charge to Agreement States that may want to replace their existing licensing and inspection systems.

WBL has a robust design and a continuous improvement process. It meets mandated system requirements and overall materials licensing

³ Reciprocity is NRC recognition of certain Agreement State licenses for work performed in areas of NRC jurisdiction. The Reciprocity Tracking System was used for tracking reciprocity activities, assisting in the planning of inspections of reciprocity activities, and providing summaries of reciprocity activities and inspections on an agencywide basis.

⁴ The main purpose of the Transportation Approval Packaging Information System was to maintain information about NRC certified packages or containers used to transport nuclear materials. These packages must undergo a review and approval process that determines if their designs are adequate to safely transport the radiological material.

⁵ The International Atomic Energy Agency promulgated a categorization system of radioactive materials for use by regulators. The categories rank radioactive materials in terms of their potential to cause harm to human health. Category 1 materials are extremely dangerous, with potential to cause permanent injury or fatality in less than an hour. Category 2 materials are very dangerous, with potential to cause permanent injury in hours or fatality in hours to days.

needs. System use and data accrual since deployment have strengthened WBL and highlighted the potential in its capabilities.

Resources Allocated

WBL expenditures for maintenance and operational support are tracked through the Integrated Source Management Portfolio budget; however, it is estimated that NRC spends approximately \$3 million on the system annually. This figure covers 2.5 full time employee equivalents, system development, hosting, and user support activities.

II. OBJECTIVE

The audit objective was to determine whether WBL meets its required operational capabilities and provides for the security, availability, and integrity of the system data. The report appendix contains information on the audit's scope and methodology.

III. FINDING

Business Processes Limit WBL's Benefits

Through its design and continuous improvement process, WBL generally meets its required operational capabilities as outlined in the system's requirements documents. WBL replaces the mainframe-based License Tracking System with a Web-based relational database and application system. However, use of WBL can be improved to better support effective and efficient operations. Currently, efficiency and effectiveness are hindered by

- Varied use of WBL among NRC regions.
- Outdated business processes.
- Lack of standardization.

What Is Required

WBL Should Support Effective and Efficient Operations

Federal Guidance

[Internal control activities](#) help ensure that management's directives are carried out. Control activities should be effective and efficient in accomplishing the agency's objectives. Information systems provide internal controls for business processes. Effective operations produce the intended results from operational processes, while efficient operations do so in a manner that minimizes the waste of resources.

Automated control activities are either wholly or partially automated through the entity's information technology. Manual control activities are performed by individuals with minor use of the entity's information technology. Automated control activities tend to be more reliable because they are less susceptible to human error and are typically more efficient.

NRC Guidance

[NRC's Principles of Good Regulation](#) stipulate that NRC should have the best management and administration, the highest technical and managerial competence, a continual upgrading of its regulatory capabilities, and timely decisionmaking while minimizing the use of resources. In particular, the efficiency principle states, "where several effective alternatives are available, the option which minimizes the use of resources should be adopted."

What We Found

WBL Use Varies by Region

License reviewer and inspector use of WBL varies. Region I technical staff make the least hands-on use of WBL, while Region IV technical staff demonstrate the most direct use. Use by technical staff within Region III represents the full range.

Technical Staff Duties

Technical staff in NRC regional offices are qualified to exercise authority in reviewing and approving licensing actions and in evaluating licensee performance during inspections. For many licensing actions and for inspections, reliable, current license information is the basis of technical staff's understanding of what is authorized for and required of a licensee.

License Reviewers

The request for a new license, amendment, or other licensing action, must be reviewed for conformity with NRC regulations providing for safe and secure use of radioactive materials. This regional review contains both administrative and technical steps. A request or application received by a regional office must be evaluated for completeness, processed, and tracked throughout the technical review to license or amendment issuance. WBL contains information on all current NRC materials licensees and provides milestones for recording steps in the review process.

The administrative and technical aspects of license review are linked by a WBL report called the "License Fee Worksheet." Printed by the licensing assistant when the request is initially processed, the worksheet serves as a cover sheet for the paper file used in the license review. Reviewers mark up the worksheet with needed changes to the license record in WBL. Although the worksheet contains data from WBL, the license reviewer does not need to refer to WBL to complete the review. Table 1 summarizes how WBL is used in the license review process in the regions.

Table 1: WBL Use in Materials Licensing

License Reviewers use of WBL for:	Regions		
	Region I	Region III	Region IV
Processing License Actions	No – Use paper or electronic document files. Rely on licensing assistants to print out hard copy license work sheets and enter the information in WBL.	No – Use paper or electronic document files. Rely on licensing assistants to print out hard copy license work sheets and enter the information in WBL.	Varies – Use paper or electronic document files. Licensing assistant prints worksheets and enters data. However, some license reviewers enter changes themselves in WBL.
Obtaining License Information	No – Use paper printouts generated by Licensing Assistant Team or access information in electronic document files.	Varies – Some license reviewers refer to WBL frequently, in addition to paper or electronic records, while others rarely refer to it for information.	Yes – Frequently used as a reference, in addition to paper or electronic records.

Source: OIG generated

Inspectors

NRC inspectors periodically visit licensees to ensure their activities conform to regulatory and license requirements. Although the inspection process is inherently less administrative than license review, staff must track inspections due, schedule and plan inspection trips to efficiently meet inspection deadlines and targets, and track inspection report issuance and any findings or resulting enforcement actions. Table 2 summarizes how WBL is used in the inspection business process in the regions.

Table 2: WBL Use in Materials Inspection

Use of WBL by Materials Inspectors For:	Regions		
	Region I	Region III	Region IV
Processing Inspections	No – Data entry contractors enter inspection results in WBL.	Yes – Inspector enters completed inspection date and findings into WBL.	Yes – Inspector enters completed inspection date and findings into WBL.
Referencing license and inspection information	No – Inspector / scheduler relies on reports generated by the licensing assistant for data to schedule trips, plan inspections, and track steps.	Partially – Inspector / scheduler exports inspection data from WBL to Microsoft Excel and Word to schedule trips, plan inspections, and track steps.	Partially – Inspector / scheduler exports inspection data from WBL to Microsoft Excel and Word to schedule trips, plan inspections, and track steps. Some inspectors access WBL from the road for reference.
Tracking and Entering Reciprocity Information	No – Use paper files; rely on lead licensing assistant or data entry contractors to print out hard copy work sheets and to enter information in WBL.	Yes.	Yes.
Tracking and Entering Findings Information	No – Performed by licensing assistant; Inspectors not aware of findings data in WBL.	Yes – Entered into WBL by inspector.	Yes – Entered into WBL by inspector.

Source: OIG generated

In spite of their use of secondary systems, inspectors conveyed to OIG their understanding of WBL's potential benefits. One inspector described WBL as the "ultimate source" of license information for an inspector and believes the system could also be the primary source for inspection information. Another inspector envisioned that the overall inspection effort will be more effective when greater consistency among the regions allows headquarters to get an agencywide view of inspection activities and results without having to go to each region for information.

Resistance to WBL

License reviewers who do not use WBL are unfamiliar with the system, its abbreviations, and the WBL User Guide. Few license reviewers and inspectors are entering data directly. All regions use secondary systems, both paper files and software applications, to some extent as workarounds or to perform duplicative tasks. Lack of familiarity with WBL also fosters concerns about data integrity of the system. One staff member suggested the system is too complex to be able to maintain data integrity. Another acknowledged that it is easy to access information when needed, but believed that data integrity is an issue and did not refer to the system for license reviews. These concerns regarding data integrity have also contributed to delaying implementation of WBL's license and document generation feature. Expressions of distrust are in contrast to the view of a frequent technical user, who is willing to enter data directly and believes it would help ensure accuracy.

Separation of Final Processing

After the technical review, the license reviewer creates the new license and authorizes the license by signing it. The paper file is returned to the licensing assistant, who is responsible for mailing the license and ensuring the final steps in recording the licensing action in WBL are completed. In two regions, the marked-up License Fee Worksheet is passed to data entry contractors to make the license changes in the system. Table 3 summarizes data entry responsibilities in the regions.

Table 3: Responsibility for Data Entry in WBL

Data Entered in WBL	Regions		
	Region I	Region III	Region IV
Responsible Staff	Contract data entry staff and licensing assistants.	Contract data entry staff and licensing assistant.	Licensing assistant primarily; some technical staff enter data.

Source: OIG generated

While entering the marked changes into WBL, both contract and agency data entry staff perform a self-check for obvious errors or items that are not clear. Until data changes are entered into WBL, which occurs after the signed license is mailed to the licensee, the WBL record of license data is not current with the approved license.

Confirmation of Changes

WBL does not have a capability allowing users to view changes made or a chance to confirm those changes prior to saving them in a license record. Typically, changes entered into a WBL record are reviewed on the License Fee Worksheet as part of the next licensing action. For the most part, technical staff do not follow up on data entered by others until a license amendment is requested. Because some licenses are amended frequently and others are amended rarely, license review staff verify data of some licenses multiple times per year, and others not for years until amendment or renewal. Periodic quality assurance reviews of licensing actions focus on the technical quality of the review and accuracy of the license and include only limited review of data in WBL. WBL maintains the integrity of data entered into the system, but there is no built-in mechanism or control on data entry to ensure that the data entered into WBL is accurate.

Why This Occurred

Outdated Processes and Lack of Standardization

NRC's regions appended WBL to the existing license review process and procedures, without restructuring how work would be completed. Additionally, regional managements have differed in their approach to requiring direct use of WBL by those assigned roles in the system.

Outdated Business Processes

The existing process is structured on outdated licensing administrative guidance that is a legacy of a former system. The current disconnect between many license reviewers and WBL reflects the procedures

described in NUREG-1556, Volume 20,⁶ published in 2000. This document sharply distinguishes administrative and data entry activities performed by licensing assistants using NRC's legacy License Tracking System from technical review activities. When WBL was introduced, no substantive change was made in processes. A manager stated that the intent was to re-create with WBL the local control that existed with the License Tracking System.

The NUREG guidance also does not reflect other, more recent developments. For inspectors, using the applications and relational license database in WBL as a tool to track inspections and findings is an entirely new function not included in the License Tracking System mainframe version. Also, as part of the Integrated Source Management Portfolio, WBL plays a role in tracking radiological material transactions, another function not envisioned in the License Tracking System and related guidance.

Lack of Standardization

Carryovers from legacy system operations, such as the use of the worksheet and the clear demarcation between technical review and data entry, foster a lack of standardization. In particular, there are no agencywide rules for data entry. In some cases, regional offices have developed their own job aids for data entry, but one staff member reported, "We are told how to enter information but not what to enter." While the use of menus in WBL limits choices for entry in many fields, other fields must be filled out or enable notes to be added to the record.

The inspection module is newer and less developed than the licensing module, with fewer search options and less flexibility for users seeking information about inspections. Also, WBL inspection milestones are not sufficiently detailed to permit tracking of such steps as inspection report completion. Inspectors must use secondary systems to bridge the gap between an inspection appearing as due in WBL and the final inspection information being entered into WBL. In two regions, tracking in secondary systems is done by inspectors themselves. In another, the licensing assistants "close the loop." Further, the regions use the present

⁶ [NUREG-1556, Volume 20](#), *Consolidated Guidance About Materials Licenses: Guidance About Administrative Licensing Procedures*, December, 2000.

inspection milestones differently, and tracking inspections with the standard reports is inconsistent among the regions.

Users who are not fully “engaged” with the system perpetuate what one staff member called the “gatekeeper model,” where limited staff have access to the information. The separation of data entry from the technical work obviates the need for technical staff, particularly license reviewers, to engage with WBL. WBL capabilities remain unexploited in several key areas:

- Underuse of WBL’s accessibility to a large number and variety of users.
- Documents intended to be created in WBL are still prepared in Microsoft Word.
- Management reports in WBL re-create legacy system reports with unclear benefits.

Why This Is Important

Current Use of WBL Does Not Promote Effective and Efficient Operations

Time and costs are increased because the “right” people for optimal results are not using WBL. This lessens efficiency and effectiveness because there is

- Continuation of paper processes with a lot of steps while many hands touch the hardcopy licensing file.
- Repeated data verification by technical staff for frequently amended licenses.
- Separation of data entry responsibilities.
- Continued use of secondary systems.

Outdated processes sustain the view of WBL as a data repository only. Non-automated steps are inefficient and can undermine real or perceived data reliability. The license and the WBL record may not match and reports and search results may appear inconsistent. Inspectors want to remove WBL limitations so recording and accessing inspection information will be more efficient. The lack of connection to the system serves as a barrier to acceptance of WBL and prevents realization of its benefits.

Recommendations

OIG recommends that the Executive Director for Operations

1. Develop and implement agencywide standardized business processes for WBL use, and develop appropriate guidance.
2. Revise WBL roles to require license reviewers and materials inspectors to process their work directly in WBL.
3. Develop and implement quality assurance mechanisms for confirmation of data changes in WBL.
4. Solicit inspection staff input to identify user needs for enhancement of WBL inspection module functionality.

IV. CONCLUSION

NRC's recent [Project Aim 2020 report](#) found that the agency achieves a high level of success in accomplishing its safety and security mission, but effectiveness, efficiency, agility, flexibility, and performance must improve for the agency to continue to succeed in the future. The report conclusion reinforces the value of NRC's WBL to enhancing the effectiveness and efficiency of the oversight of nuclear materials. The report further noted that a lack of standardized processes is an obstacle to reaching goals of efficiency and agility. OIG concludes that full implementation of WBL's capabilities can strengthen NRC's oversight of the National Materials Program, unifying efforts to monitor and secure radioactive materials.

V. AGENCY COMMENTS

An exit conference was held with the agency on June 18, 2015. Prior to this meeting, after reviewing a discussion draft, agency management provided comments that have been incorporated into this report, as appropriate. As a result, agency management stated their general agreement with the findings and recommendations in this report and opted not to provide formal comments for inclusion in this report.

OBJECTIVE, SCOPE, AND METHODOLOGY

Objective

The audit objective was to determine whether WBL meets its required operational capabilities and provides for the security, availability, and integrity of the system data.

Scope

This audit focused on the use of WBL by NRC offices responsible for materials safety to determine whether WBL operational capabilities support business processes, and whether the system adequately provides for the availability and integrity of system data. OIG determined that WBL system security controls had been reviewed as part of OIG's *Independent Evaluation of NRC's Implementation of the Federal Information Security Management Act [FISMA] for Fiscal Year 2013* ([OIG-14-A-03](#)). OIG conducted this performance audit from January 2015 to May 2015 at NRC headquarters (Rockville, MD). Internal controls related to the audit objectives were reviewed and analyzed. Throughout the audit, auditors were aware of the possibility of fraud, waste, and abuse in the program.

Methodology

OIG reviewed relevant criteria for this audit, including Government Accountability Office Standards for Internal Control in the Federal Government; NRC WBL System Requirements; NRC WBL Security Requirements; and NRC's Principles of Good Regulation.

The audit team reviewed NRC guidance related to the implementation and current use of WBL. Key documents reviewed include NUREG-1556, Volume 20, "Guidance About Administrative Licensing Procedures"; WBL User Guide; WBL Change Control Board documents; and NRC regional office guidance and performance self-assessments. OIG also performed WBL system reviews. These reviews evaluated WBL's conformity with security standards, verification of license information through WBL, and review of WBL reports and search functions for usability and reliability.

OIG interviewed NRC staff and management to gain an understanding of roles and responsibilities as they relate to how NRC uses WBL in its radioactive materials licensing and inspection business processes. Auditors interviewed staff from the Office of Nuclear Material Safety and Safeguards and from NRC Regions I (King of Prussia, PA), III (Lisle, IL), and IV (Arlington, TX). OIG auditors also observed a walkthrough of materials license request processing and use of WBL in NRC Region I.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

The audit was conducted by Beth Serepca, Team Leader; Robert Woodward, Audit Manager; Amy Hardin, Senior Auditor; Nandini Sharma, Auditor, and Andrew Pham, Student Analyst.

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COMMENTS AND SUGGESTIONS

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